Confirmatory Survey of Building 4020
Concrete Blocks
Santa Susana Field Laboratory
Boeing - Rocketdyne
Ventura County, California

Prepared By
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Reviewed by: Steve Hsu Date: 9/27/99

Introduction:

The concrete blocks and materials were generated from the sectioning of the walls and floors of the Rockwell International Hot Laboratory (RIHL) during demolition of the building. At the time of demolition, these blocks (85 decontaminated structural concrete sections s/n 568A, 764 – 809A, 809B - 845) were found to have surface radioactive contamination and they were subsequently decontaminated by Boeing-Rocketdyne. The purpose of this survey is to determine if the blocks may be released for unrestricted use as defined in DECON – 1 (Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use).

Reference Document:

1. Letter 99RC-2696, with enclosures, from James Barnes to Roger Lupo, "Disposal of Rockwell International Hot Lab (RIHL) Wall Section Blocks", July 2, 1999.

Survey Personnel:

Roger Lupo, Lisa Brown and John Rexroth of the Radiological Health Branch performed a confirmatory survey on July 29, 1999.

Survey Instruments:

Manufacture & Model	S/N	Probe/detector	S/N	Calibration due date
Ludlum Micro R m-19	80435	Internal NaI 1x1 scint.	NA	5/1/1999
Ludlum Micro R m-19	42969	Internal NaI 1x1 scint.	NA	7/1/2000
Ludlum model 3	134076	44 – 2 NaI 1x1 scint.	PR137133	12/1/1999
Ludlum model 18	105775	44 – 9 G-M pancake	PR110029	11/8/1999
Ludlum model 2224	149367	43 – 89 100 cm^2 dual scint.	PR154122	9/26/1999

Survey Report:

The equipment listed in the above table were function checked and background measurements were taken. Background measurements are listed in Table 1. A general survey with a NaI detector sensitive to gamma photons of all the blocks and a GM pancake (beta/gamma) survey of a selected number of the blocks were performed by Radiologic Health Branch personal. The general gamma survey measurements ranged between 2500 cpm and 3500 cpm. The blocks selected at random for survey by G-M pancake had measurements ranging between 20 and 200 cpm. Direct measurements and swipe samples were taken from selected blocks. The swipe samples were sent to the Sanitation and Radiation Laboratory Branch (SRLB) in Berkeley. The survey results are listed in Table 2 and the SRLB analysis results of the swipe sample are listed in Table 3.

Table 1: Background Measurements

Measurements made at Building 4038

Meter	Reading
Ludlum Micro R m-19 (Exposure rate)	12 – 14 μR/hr
Ludlum model 3 w/ 44 – 2 1x1 NaI (gamma)	2.5K to 3K cpm
Ludlum model 18 w/ 44 – 9 GM (beta & gamma)	60 to 110 cpm
Ludlum model 2224 w/ 43-89 (alpha and/or beta)	2 cpm alpha / 622 cpm beta

Table 2: Field Survey Data
Concrete Block Survey July 29, 1999 Building 4020 (hot cell) debris all measurements are gross count numbers.

Item #	Swipe ID[1]	Block Id	µR/hr	gamma scan (cpm)	G-M scan (cpm)	contact measurements[1]			
						µR/hr	alpha (cpm)	beta (cpm)	beta/gamma (cpm)
1		568A	12 - 15	3k – 3.5k	*				
2		764	12 – 15	3k – 3.5k	*				
3		765	12 – 15	3k – 3.5k	*				
4	6	766	12 – 15	3k – 3.5k	20 – 110	11	1	517	60 - 80
5		767	12 – 15	3k – 3.5k	*				
6		768	12 – 15	3k – 3.5k	60 – 110				
7		769	12 – 15	3k – 3.5k	80 – 160				
8		770	12 – 15	3k – 3.5k	*				
9		771	12 – 15	3k – 3.5k	*				
10		772	12 – 15	3k – 3.5k	*				
11		773	12 – 15	3k – 3.5k	*				
12		774	12 – 15	3k – 3.5k	*				
13		775	12 – 15	3k – 3.5k	60 – 110				
14		776	12 – 15	3k – 3.5k	60 – 180				
15		777	12 – 15	3k – 3.5k	60 – 180				
16		778	12 – 15	3k – 3.5k	60 – 180				
17		779	12 – 15	3k – 3.5k	60 – 180				
18		780	12 – 15	3k – 3.5k	*				
19		781	12 – 15	3k – 3.5k	*				
20		782	12 – 15	3k – 3.5k	40 – 140				
21	7	783	12 – 15	3k – 3.5k	*	11	6	620	80 – 90
22		784	12 – 15	3k – 3.5k	*				
23		785	12 – 15	3k – 3.5k	*				
24		786	12 – 15	3k – 3.5k	*				
25		787	12 – 15	3k – 3.5k	*				
26		788	12 – 15	3k – 3.5k	*				
27		789	12 – 15	3k – 3.5k	*				

Item #	Swipe ID[1]	Block Id	µR/hr	gamma scan (cpm)	G-M scan (cpm)	contact measurements[1]			
						µR/hr	alpha (cpm)	beta (cpm)	beta/gamma (cpm)
28		790	12 – 15	3k – 3.5k	*				
29		791	12 – 15	3k – 3.5k	*				
30		792	12 – 15	3k – 3.5k	*				
31		793	12 – 15	3k – 3.5k	60 – 120				
32		794	12 – 15	3k – 3.5k	60 – 140				
33		795	12 – 15	3k – 3.5k	*				
34		796	12 – 15	3k – 3.5k	*				
35		797	12 – 15	3k – 3.5k	*				
36		798	12 – 15	3k – 3.5k	*				
37		799	12 – 15	3k – 3.5k	60 – 120				
38		800	12 – 15	3k – 3.5k	*				
39		801	12 – 15	3k – 3.5k	*				
40	9	802	12 – 15	3k – 3.5k	20 – 200	11.5	4	598	60
41		803	12 – 15	3k – 3.5k	*				
42	5	804	12 – 15	3k – 3.5k	60 – 120	7.5	5	343	40 – 50
43		805	12 – 15	3k – 3.5k	60 – 110				
45	8	806	12 – 15	3k – 3.5k	*	10	3	578	60 – 80
46		807	12 – 15	3k – 3.5k	40 – 150				
47		808	12 – 15	3k – 3.5k	*				
48	3	809A	12 – 15	3k – 3.5k	40 – 100	10	4	645	80
49		809B	12 – 15	3k – 3.5k	*				
50		810	12 – 15	3k – 3.5k	50 – 100				
51	10	811	12 – 15	3k – 3.5k	*	7	3	633	65 – 85
52		812	12 – 15	3k – 3.5k	*				
53		813	12 – 15	3k – 3.5k	40 – 120				
54		814	12 – 15	3k – 3.5k	*				
55		815	12 – 15	3k – 3.5k	*				
56		816	12 – 15	3k – 3.5k	*				
57	4	817	12 – 15	3k – 3.5k	*	11	3	891	70 – 90

Item #	Swipe ID[1]	Block Id	µR/hr	gamma scan (cpm)	G-M scan (cpm)	contact measurements[1]			
						µR/hr	alpha (cpm)	beta (cpm)	beta/gamma (cpm)
58		818	12 – 15	3k – 3.5k	80 – 140				
59		819	12 – 15	3k – 3.5k	*				
60		820	12 – 15	3k – 3.5k	*				
61		821	12 – 15	3k – 3.5k	80 – 100				
62		822	12 – 15	3k – 3.5k	*				
63		823	12 – 15	3k – 3.5k	*				
64		824	12 – 15	3k – 3.5k	80 – 160				
65		825	12 – 15	3k – 3.5k	*				
66	2	826	12 – 15	3k – 3.5k	*	12	0	611	80 – 90
67		827	12 – 15	3k – 3.5k	*				
68		828	12 – 15	3k – 3.5k	*				
69		829	12 – 15	3k – 3.5k	*				
70		830	12 – 15	3k – 3.5k	*				
71		831	12 – 15	3k – 3.5k	60 – 110				
72		832	12 – 15	3k – 3.5k	60 – 120				
73		833	12 – 15	3k – 3.5k	*				
74		834	12 – 15	3k – 3.5k	*				
75		835	12 – 15	3k – 3.5k	*				
76		836	12 – 15	3k – 3.5k	40 – 100				
77		867	12 – 15	3k – 3.5k	60 – 120				
78		838	12 - 15	3k – 3.5k	*				
79		839	12 – 15	3k – 3.5k	*				
80	1	840	12 – 15	3k – 3.5k	*	15	1	633	60 - 80
81		841	12 – 15	3k – 3.5k	40 – 180				
82		842	12 – 15	3k – 3.5k	*				
83		843	12 – 15	3k – 3.5k	*				
84		844	12 – 15	3k – 3.5k	*				
85		845	12 – 15	3k – 3.5k	60 – 110				

1. Wipe samples were collected for approximately 10 % of the number of blocks for a confirmatory survey.

Table 3: Sanitation and Radiation Laboratory Results.

Block ID	Wipe ID	Laboratory Analysis	Results ± CE ($pCi/100cm^2$)	Results ± CE ($dpm/100cm^2$)
840	1	Gross alpha Gross Beta	N.D. 1.59 ± 0.43	N.D. 3.53 ± 0.95
826	2	Gross alpha Gross Beta	N.D. N.D.	N.D. N.D.
809A	3	Gross alpha Gross Beta	N.D. 1.81 ± 0.44	N.D. 4.02 ± 0.98
817	4	Gross alpha Gross Beta	N.D. 2.98 ± 0.49	N.D. 6.62 ± 1.09
804	5	Gross alpha Gross Beta	N.D. N.D.	N.D. N.D.
766	6	Gross alpha Gross Beta	N.D. N.D.	N.D. N.D.
783	7	Gross alpha Gross Beta	N.D. 1.09 ± 0.40	N.D. 2.42 ± 0.89
806	8	Gross alpha Gross Beta	0.397 ± 0.247 1.77 ± 0.44	0.88 ± 0.55 3.93 ± 0.98
802	9	Gross alpha Gross Beta	N.D. 0.865 ± 0.394	N.D. 1.92 ± 0.87
811	10	Gross alpha Gross Beta	N.D. N.D.	N.D. N.D.
composite	1 - 10	Gamma Scan (Cs-137)	3.97 ± 1.44 (pCi/10 wipes)	8.81 ± 3.20 (pCi/10 wipes)

CE → counting error at the 95% confidence level.
N.D.→ Not Detected

Summary:

The survey results of the representative samples of concrete blocks were at background levels. The results of the contact measurements and the laboratory analysis of collected samples indicate activity levels below the acceptable surface contamination levels listed in DECON-1 (Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use). I recommend the 85 decontaminated structural concrete sections be released for unrestricted use.

Prepared by: Roger Logo Date: 9-27-99